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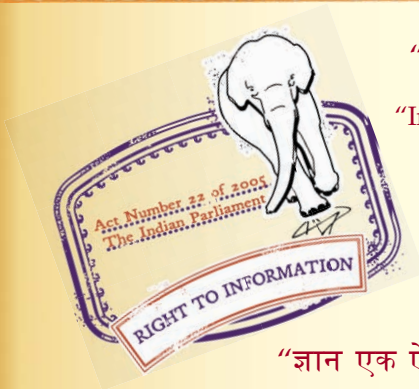
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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4440 (1996): Engineering metrology - Precision Equipment
- Slip Gauge Accessories [PGD 25: Engineering Metrology]



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“Knowledge is such a treasure which cannot be stolen”

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इंजीनियरी माप विज्ञान —

परिशुद्धता संबंधी उपस्कर — स्लिप गेज उपसाधन

(पहला पुनरीक्षण)

Indian Standard

ENGINEERING METROLOGY —
PRECISION EQUIPMENT — SLIP GAUGE
ACCESSORIES

(*First Revision*)

ICS 17.040.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Engineering Metrology Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

Slip gauge accessories are used for precision marking, inspections, etc. These accessories can be built up quickly and used as a temporary limit gauge.

This standard was originally published in 1967. In the present revision following major changes have been made:

- a) The accessory sets have been clearly defined on the basis of number of pieces contained in each set. The quantity and type of pieces in a particular set are also determined in order to rationalize the variety of various combinations of these pieces in a set. This gives definite identity to the set.
- b) The hardness of various hardened pieces has been brought in line with gauge components in other standards.
- c) The tram point which is widely used, has been included in 23 pieces set.

The requirements for slip gauges have been covered in IS 2984 : 1981 'Specification for slip gauges'.

This standard is based on the manufacturing practices followed in the country.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ENGINEERING METROLOGY — PRECISION EQUIPMENT — SLIP GAUGE ACCESSORIES

(*First Revision*)

1 SCOPE

This standard covers the dimensions, material, accuracy and other requirements of the following slip gauge accessories:

- a) Base,
- b) Holders,
- c) Measuring jaws,
- d) Parallels,
- e) Scribes,
- f) Centre points, and
- g) Tram points.

2 REFERENCES

The following Indian Standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
1501 (Part 1) : 1984	Method for vickers hardness test for metallic materials: Part 1 HV5 to HV 100 (<i>second revision</i>)
7018 (Part 1) : 1983	Technical supply conditions for gauges: Part 1 General (<i>first revision</i>)

have the following configuration:

<i>Sl No.</i>	<i>Description</i>	<i>Seven Pieces Set</i>	<i>Thirteen Pieces Set</i>	<i>Twenty-three Pieces Set</i>
i)	Base (Steel)	1	1	1
ii)	Holder 0-50 mm	1	1	1
iii)	Holder 0-100 mm	1	1	1
iv)	Holder 100-200 mm	1	1	1
v)	Holder 100-250 mm	—	—	1
vi)	Resting Jaw (Large)	1	1	1
vii)	Resting Jaw (Small)	1	1	1
viii)	2 mm radius piece	—	2	2
ix)	5 mm radius piece	—	2	2
x)	8 mm radius piece	—	—	2
xi)	12 mm radius piece	—	—	2
xii)	20 mm radius piece	—	—	2
xiii)	Scriber	—	1	1
xiv)	Centre point	—	1	1
xv)	Tram point	—	—	2
xvi)	Parallels	1	1	2

4 MATERIAL

The slip gauge accessories shall be made from suitable steel as given in IS 7018 (Part 1) : 1983. The accessories shall be hardened, wherever required, uniformly to 650 *HV Min* [see IS 1501 (Part 1) : 1984].

5 REQUIREMENTS

5.1 Base

5.1.1 A typical design of base is given in Fig. 1. The base shall be of robust construction and shall be stable when used with the longest size holder. Suitable provision shall be made for the attachment of the holder with the base in a position square to the wringing surface of the base. The sides of the base shall be suitably relieved so as to provide convenient finger grips.

3 CLASSIFICATION OF SLIP GAUGE ACCESSORIES SET

The slip gauge accessories sets shall be classified as 7 pieces set, 13 pieces set and 23 pieces set and shall

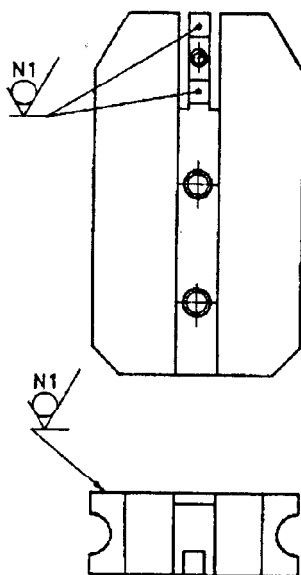


FIG. 1 BASE

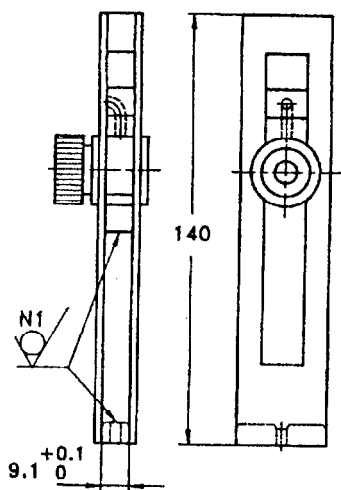
5.1.2 The surface of the base that slides on surface plate, shall be flat within 0.001 mm and shall have good lapping finish.

5.1.3 The lapped surface that carries holder shall be at the height of 25 ± 0.001 mm from the bottom surface of the base.

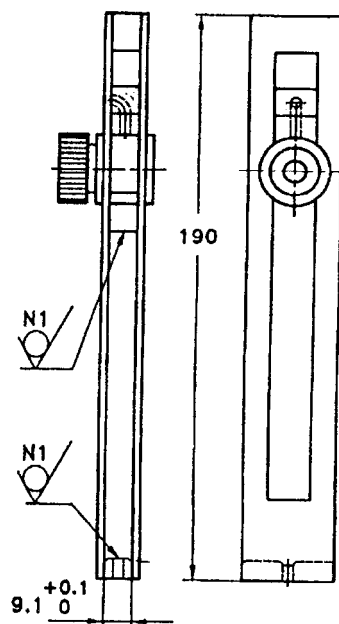
5.2 Holders

5.2.1 The holders shall be of the following ranges excluding 20 mm for two measuring jaws (see Fig. 2 to 5):

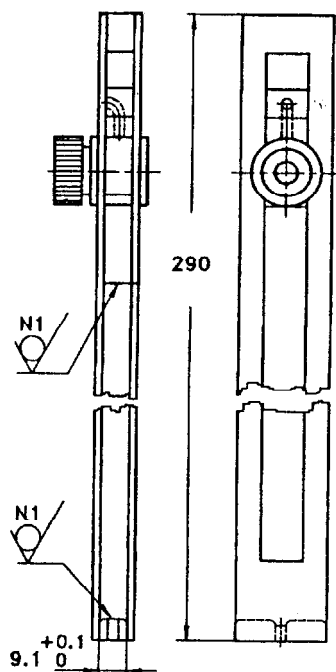
- 0-50 mm
- 0-100 mm
- 100-200 mm
- 100-250 mm



All dimensions in millimetres.
FIG. 2 HOLDER 0-50 mm

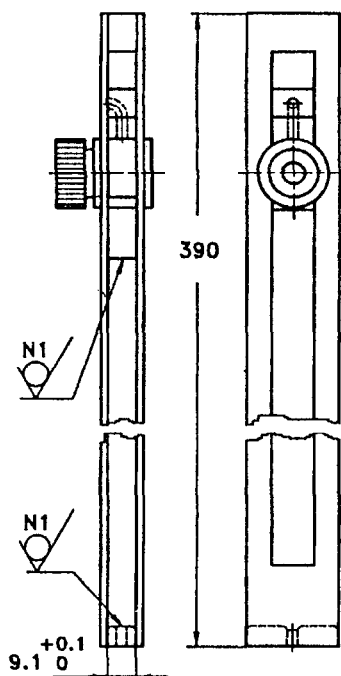


All dimensions in millimetres.
FIG. 3 HOLDER 0-100 mm



All dimensions in millimetres.
FIG. 4 HOLDER 100-200 mm

5.2.2 The holders shall be of suitable design for holding rigidly, combination of slip gauges within their range. The slip combination shall be adequately tightened in the holder and over tightening may be avoided by relieving the end jaw appropriately. The supplier may use top screw clamping practice for holders up to 100 mm.



All dimensions in millimetres.
FIG. 5 HOLDER 100-250 mm

5.2.3 The internal width between the side walls of the holders shall be $9.10^{+0.10}_{-0}$ mm when measured at either ends.

5.2.4 The lapped surfaces upon which the slip gauges or other accessories will be resting during use shall be flat and parallel within 0.001 mm to the surface of holder resting the base.

5.2.5 The resting surfaces of slips/jaw shall be parallel to the base of holder within 0.001 mm.

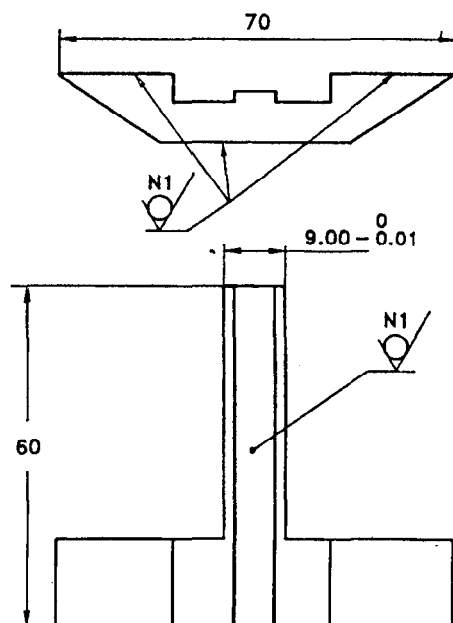
5.2.6 Squareness of the side face in contact with side face of the slip shall be within 0.05 mm with respect to jaw/slip resting face of the holder.

5.3 Measuring Jaws

5.3.1 Measuring jaws shall be of following types.

5.3.1.1 Resting jaws

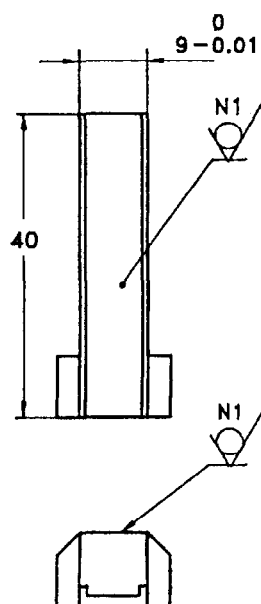
These are mainly used for resting large and small bore gauges with slip gauge combination. The design and dimensions of large resting jaw and small resting jaw shall be as given in Fig. 6 and Fig. 7.



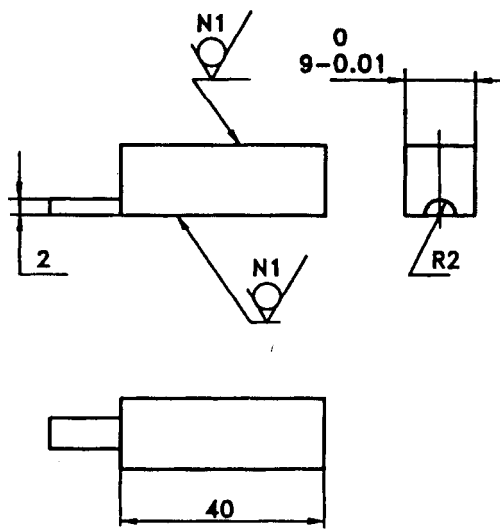
All dimensions in millimetres.
FIG. 6 RESTING JAW (LARGE)

5.3.1.2 Radius pieces

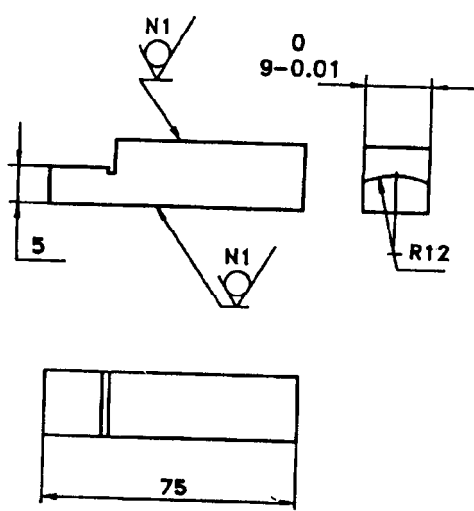
The design and dimensions of 2 mm, 5 mm, 8 mm, 12 mm and 20 mm radius pieces shall be as given in Fig. 8 to Fig. 12.



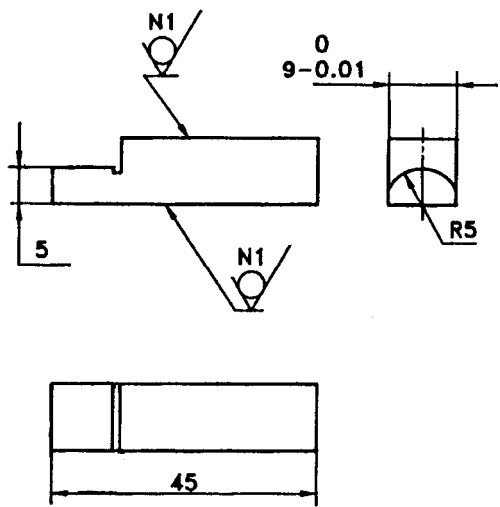
All dimensions in millimetres.
FIG. 7 RESTING JAW (SMALL)



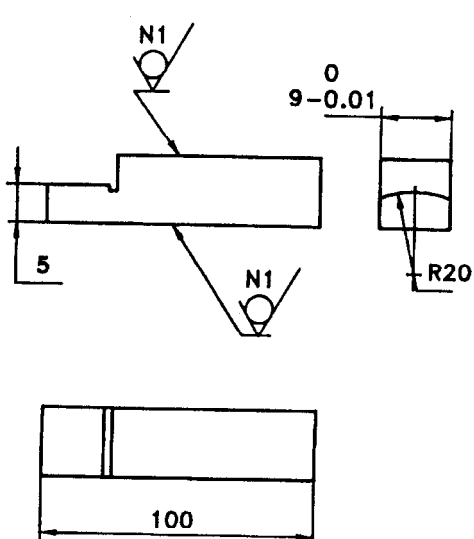
All dimensions in millimetres.
FIG. 8 2 mm RADIUS PIECE



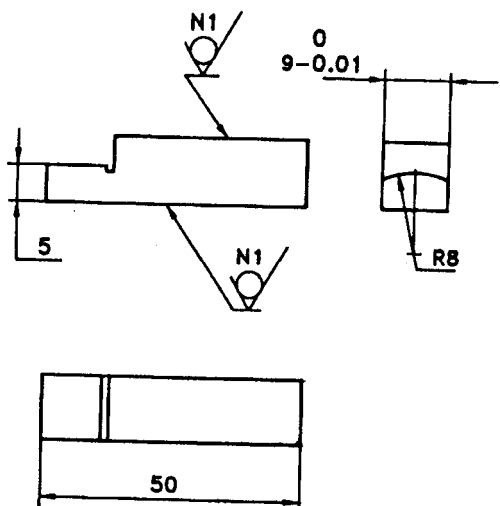
All dimensions in millimetres.
FIG. 11 12 mm RADIUS PIECE



All dimensions in millimetres.
FIG. 9 5 mm RADIUS PIECE



All dimensions in millimetres.
FIG. 12 20 mm RADIUS PIECE



All dimensions in millimetres.
FIG. 10 8 mm RADIUS PIECE

5.3.2 The wringing surface of each measuring jaw shall be flat within 0.000 3 mm/35 mm length.

5.3.3 The nominal size of jaw which is involved in measurement, shall be accurate ± 0.001 mm.

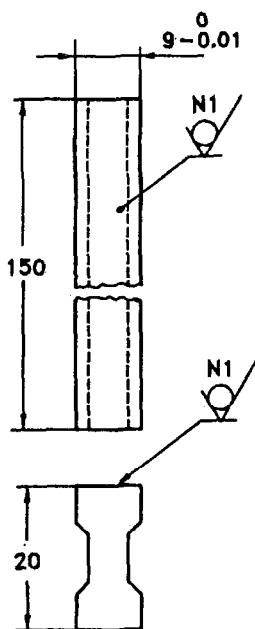
5.3.4 When pair of measuring jaws is wrung together, the error in overall dimensions shall be within ± 0.001 5 mm.

5.3.5 The surface of measuring jaws, which are at right angles to each other shall be accurate within $90^\circ \pm 30'$ or 50 μ m whichever is less.

5.3.6 The centre of the radius 'r' in case of radius pieces, shall be in the middle of the side faces within 0.025 mm.

5.4 Parallels

5.4.1 The design and dimensions of parallels shall be as given in Fig. 13.



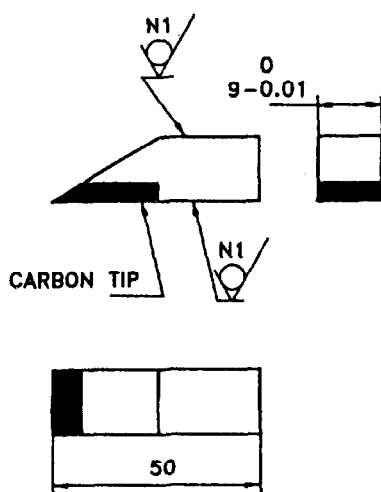
All dimensions in millimetres.
FIG. 13 PARALLELS

5.4.2 The wringing surfaces of the parallel shall be flat within 0.000 3 mm/35 mm and parallel within 0.000 5 mm.

5.4.3 The surfaces of the parallel which are at right angles to wringing surfaces shall be accurate to within $90^\circ \pm 30'$ or 50 μm whichever is less.

5.5 Scriber

5.5.1 The design and dimensions of scriber shall be as given in Fig. 14.



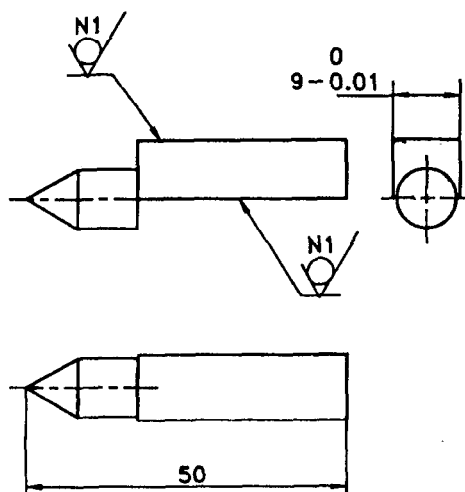
All dimensions in millimetres.
FIG. 14 SCRIBER

5.5.2 The wringing surfaces shall be flat within 0.000 3 mm/35 mm length.

5.5.3 When used in combination with centre point, the diameter of finally scribed circle shall not differ from 2 times the size of slip gauge combinations inserted between the points by more than ± 0.025 mm.

5.6 Centre Point

5.6.1 The design and dimensions of centre point shall be as given in Fig. 15.



All dimensions in millimetres.
FIG. 15 CENTRE POINT

5.6.2 The wringing surfaces shall be flat within 0.0003 mm/35 mm length.

5.6.3 The surfaces of centre point and tram point which are at right angles to each other shall be accurate within $90^\circ \pm 30'$ or 50 μm whichever is less.

5.7 Tram Point

5.7.1 The design and dimensions of tram point shall be as given in Fig. 16.

5.7.2 The wringing surfaces shall be flat within 0.000 3 mm/35 mm length.

6 FINISH

All the accessories shall have smooth finish. No burr or scratches shall be present. The sharp edges shall be broken.

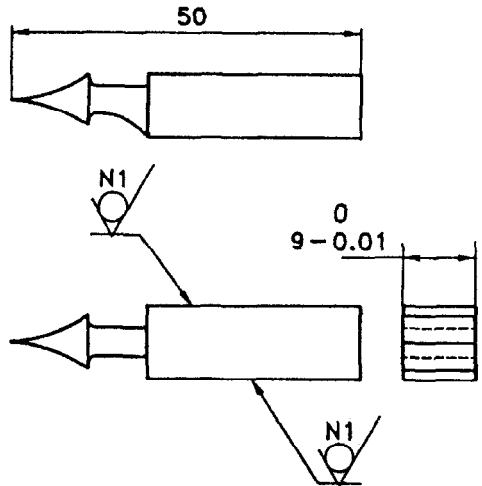
7 DESIGNATION

7.1 The slip gauge accessories set shall be designated by IS No. and number of pieces in a set.

Example:

Slip Gauge Accessories Set of 13 Pieces shall be designated as:

Slip Gauge Accessories IS 4440, 13 Pieces set



All dimensions in millimetres.
FIG. 16 TRAM POINT

8 MARKING

8.1 Base

The nominal height shall be suitably and legibly engraved/etched on the base.

8.2 Holder

The slip holding range of the holders shall be suitably and legibly engraved/etched on the side walls.

8.3 Measuring Jaw

The nominal radius in case of radius pieces shall be suitably and legibly engraved/etched.

9 APPLICATIONS OF SLIP GAUGE ACCESSORIES

The various applications of slip gauge accessories are illustrated in Fig. 17 to Fig. 20.

10 PACKING

10.1 The set of accessories shall be packed in a suitable wooden case wherein the accessories shall be separately accommodated.

10.2 The slip gauge accessory set may be engraved with the manufacturer's name or trade mark.

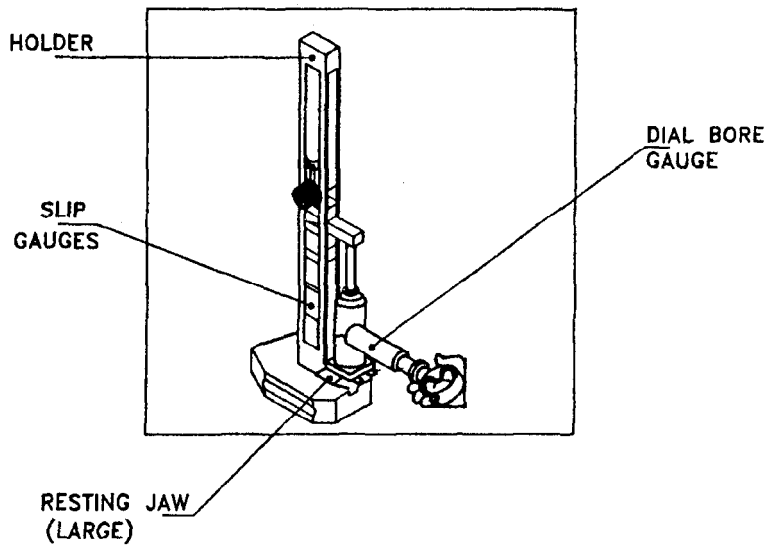


FIG. 17 BORE GAUGE SETTING

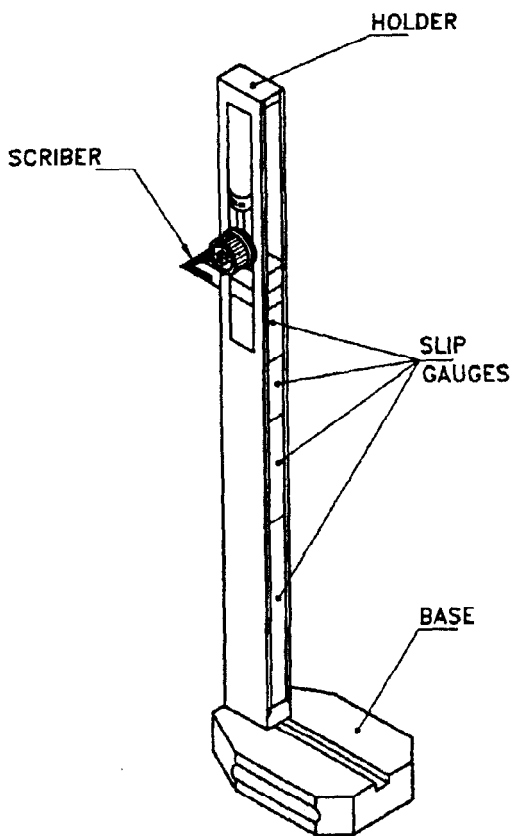


FIG. 18 SET-UP FOR HEIGHT MEASUREMENT OR HEIGHT MARKING

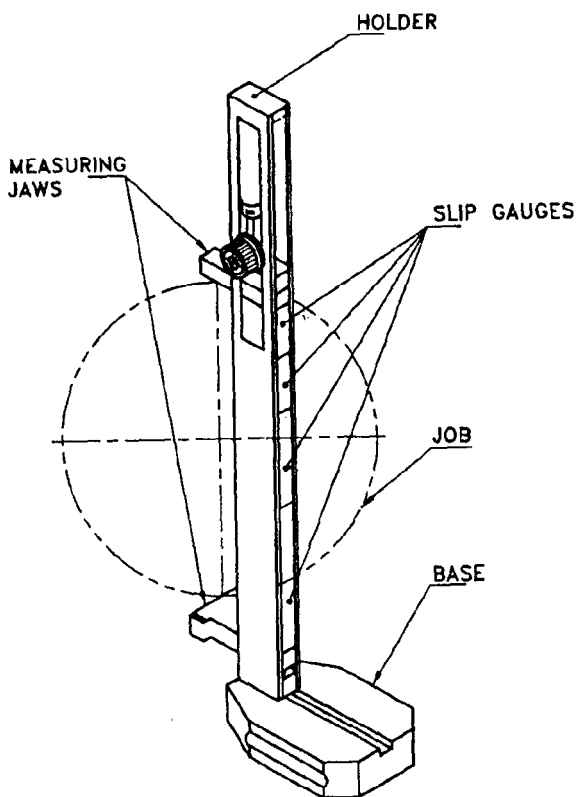


FIG. 19 SET-UP FOR OUTSIDE MEASUREMENT

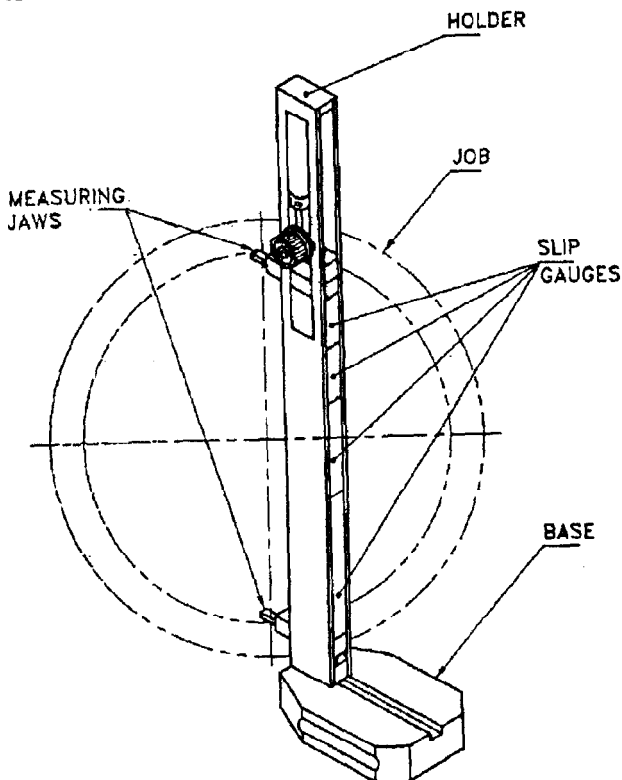


FIG. 20 SET-UP FOR INSIDE MEASUREMENT

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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